

## CLAIMS

What is claimed is:

1. A method of designing a Herschel-Quincke tube arrangement comprising the steps of:
  - a) representing a tube arrangement including a first passageway and second passageway fluidly connected to the first passageway at first and second junctions, the second passageway divided by the junctions into first, second, and third passages;
  - b) associating lengths with each of the first passageway and the first, second, and third passages producing a particular length combination;
  - c) calculating a filter parameter for the particular length combination;
  - d) associating other lengths with each of the passageway and the first, second, and third passages producing another particular length combination;
  - e) calculating another filter parameter for the other particular length combination; and
  - f) selecting one of the length combinations for the Herschel-Quincke tube arrangement based upon desired parameters including the filter parameters.
2. The method according to claim 1, wherein calculating the filter parameters includes determining a transmission loss based upon a pressure ratio of the pressures at the junctions.
3. The method according to claim 2, wherein the filter parameters are logarithmic functions of the pressure ratio.

4. The method according to claim 1, wherein the filter parameters are an average transmission loss over a standard deviation.
5. The method according to claim 4, wherein the standard deviation is a function of bandwidth of a desired frequency range.
6. The method according to claim 4, wherein the desired parameter includes the highest filter parameter.
7. The method according to claim 6, wherein the desired parameter includes a shortest length of the first passageway for the length combinations.

8. A Herschel-Quincke tube arrangement for a vehicle comprising:
  - a first passageway having a fluid inlet and a fluid outlet, the first passageway having a first outer wall; and
    - a second passageway fluidly connected to the first passageway at first and second spaced apart junctions with the second passageway divided by the junctions into first, second and third passages, the second passageway including first and second opposing terminal ends respectively spaced from the first and second junctions, the second passageway having a second outer wall with at least a portion of the second wall adjoining at least a portion of the first outer wall immediately adjacent at least one of the junctions.
9. The arrangement according to claim 8, wherein the first and second passageways have the same diameter.
10. The arrangement according to claim 8, wherein the first passage extends from the first junction to the first terminal end and the third passage extends from the second junction to the second terminal end, the first and third passages respectively including first and third lengths unequal to one another.
11. The arrangement according to claim 8, wherein the portion of the first outer wall is common with the portion of the second outer wall.

12. The arrangement according to claim 8, wherein the arrangement includes a vehicle component having first connections and at least one of the first and second portions including a second connections secured to the first connection.
13. The arrangement according to claim 12, wherein the vehicle component is an engine compartment hood.
14. The arrangement according to claim 12, wherein the vehicle component is a splash shield.
15. The arrangement according to claim 12, wherein the vehicle component is a fender.

16. A method of manufacturing a Herschel-Quincke tube arrangement comprising the steps of:

- a) forming a first passageway and second passageway fluidly connected to the first passageway at first and second junctions with the second passageway divided by the junctions into first, second, and third passages, the first and second passageways being generally planar;
- b) bending the first and second passageways to a nonplanar configuration; and
- c) securing at least one of the first and second passageways to a vehicle component.

17. The method according to claim 16, wherein step a) includes molding the first and second passageways with plastic.

18. The method according to claim 17, wherein step a) includes securing first and second portions to one another to form the first and second passageways.

19. The method according to claim 16, wherein the first and second passageways are constructed from a flexible material.

20. The method according to claim 16, wherein step b) includes heating the first and second passageway to make the passageways more pliable.